



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------|-------------|----------------------|---------------------|-------------------|
| 09/944,328 | 08/31/2001 | Brig Barnum Elliott | 00-4069 | 1878 |
| 28120 | 7590 | 05/05/2006 | EXAMINER | |
| FISH & NEAVE IP GROUP | | | | JACKSON, JENISE E |
| ROPS & GRAY LLP | | | | |
| ONE INTERNATIONAL PLACE | | | | |
| BOSTON, MA 02110-2624 | | | | |
| | | | | ART UNIT |
| | | | | PAPER NUMBER |
| | | | | 2131 |

DATE MAILED: 05/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|-------------------|----------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/944,328 | ELLIOTT, BRIG BARNUM |
| | Examiner | Art Unit |
| | Jenise E. Jackson | 2131 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on ____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) Claim(s) ____ is/are allowed.
- 6) Claim(s) 1-33 is/are rejected.
- 7) Claim(s) ____ is/are objected to.
- 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on ____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____ . |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>04212006</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: ____ . |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-33 are rejected under 35 U.S.C. 102(e) as being anticipated by

Chang(6,233,075).

3. As per claims 1, 17, Chang et al. discloses a method of securely transmitting light information in a network(see col. 3, lines 36-62) along a path including a plurality of untrusted network devices including a plurality of switching devices, sending at least one setup message to one of the network devices; based on the setup message, configuring at least one of the switching devices whereby a configured path is established(see col. 9, lines 39-61, col. 10, lines 14-48); sending a plurality of pulses of the light along the configured path, the pulses having a first set of randomly selected quantum bases; and measuring a quantum state of the light pulses using a second set of randomly selected quantum bases, thereby providing a measured quantum state(see col. 12, lines 43-67).

4. As per claims 2, 18, 20, Chang discloses wherein the plurality of switching devices includes a plurality of optical switching devices(see col. 7, lines 16-67, col. 8, lines 1-19).

5. As per claims 3, 24, Chang discloses wherein the configured path is multiplexed onto a single fiber with at least one other quantum-cryptographic signal(see col. 10, lines 14-48).

6. As per claims 4, 25, Chang discloses wherein the configured path is multiplexed using wavelength division multiplexing(see col. 7, lines 48-67, col. 8, lines 1-19).
7. As per claims 5, 26, Chang discloses wherein the configured path is multiplexed using time division multiplexing(see col. 12, lines 20-42).
8. As per claims 6, 27, Chang discloses wherein the setup message is sent using the CR-LDP protocol(see col. 12, lines 43-67).
9. As per claims 7, 28, Chang discloses wherein the setup message is sent using the RSVP protocol(see col. 8, lines 24-61).
10. As per claims 8, 29, Chang discloses wherein the setup message is sent via a data network using TCP/IP datagrams(see col. 9, lines 39-61).
11. As per claims 9, 30, Chang discloses wherein the setup message is sent via an asynchronous-transfer-mode network(see col. 9, lines 61-67, col. 10, lines 1-13).
12. As per claims 10, 21, 31, Chang discloses wherein the optical switching device includes a micro-electro-mechanical system mirror array(see col. 7, lines 49-67, col. 8, lines 1-23).
13. As per claims 11, 22, Chang discloses wherein the optical switching device includes photonic-band-gap material(see col. 10, lines 14-48).
14. As per claims 12, 23, Chang discloses wherein the optical switching device includes a mirror(see col. 19, lines 13-40).
15. As per claims 13, 32, Chang discloses wherein the light pulse in the plurality of light pulses includes a single polarized photon(see col. 3, lines 37-62).
16. As per claim 14, Chang discloses establishing at least one sending quantum basis corresponding to the first set of randomly selected quantum bases(see col. 3, lines 37-62);

establishing a corresponding receiving quantum basis corresponding to the second set of randomly selected quantum bases; determining whether the sending quantum basis has an equivalent orientation to the corresponding receiving quantum basis(see col. 3, lines 37-62); discarding any improperly oriented the light pulses for which the sending quantum basis was determined to be different from the receiving quantum basis, whereby a first remaining stream of the light pulses remains(see col. 3, lines 37-62, col. 5, lines 3-46); comparing the measured quantum state of random subset of the first remaining stream of light pulses as sent, to the first remaining stream of light pulses as received, to produce a set of variant light pulses having a quantity(see col. 8, lines 45-67, col. 9, lines 1-5); establishing a predetermined threshold against which to compare the quantity; determining whether the quantity exceeds the predetermined threshold; discarding the random subset of the first remaining stream of light pulses, whereby a second remaining stream of light pulses remains; and if the predetermined threshold is not exceeded, using the second remaining stream of light pulses as a key to encrypt and decrypt data(see col. 18, lines 25-53).

17. As per claim 15, Chang discloses wherein the sending and receiving quantum bases are polarization bases chosen from a group of polarization bases consisting of diagonal polarization basis; and rectilinear polarization basis(see col. 7, lines 48-67, col. 8, lines 1-19).

18. As per claim 16, Chang discloses wherein the sending and receiving quantum bases are phase-shift bases chosen from a group of phase-shift bases including, a 45 degree phase-shift basis; and 90 degree phase-shift basis(see col. 15, lines 20-64).

19. As per claim 19, Chang discloses a system in which light information is securely transmitted in a network along a path including of a plurality of untrusted network devices, the

plurality of untrusted network devices including a plurality of switching devices(see col. 3, lines 36-62), an electrical controller for controlling at least one of the switching devices, wherein the electrical controller is configured to receive at least one setup message from which the controller determines how to control the at least one of the switching devices(see col. 9, lines 39-61, col. 10, lines 14-48); wherein the at least one of the switching devices is configured to be oriented into at least two positions; wherein the electrical controller orients the plurality of switching devices to direct optical energy along the path; a light sending apparatus configured to send quantum-cryptographic light pulses along the path; and a light measuring apparatus configured to observe the quantum-cryptographic light pulses (see col. 12, lines 43-67).

20. As per claim 33, Chang discloses apparatus operational with light and with a polarized light pulse originating from an upstream source and terminating with a downstream destination, means for controlling at least one means for directing the light(see col. 3, lines 36-62), wherein the controlling means is configured to receive at least one configuration message for configuring the directing means(see col. 9, lines 39-61, col. 10, lines 14-48); means for orienting the directing means into at least two orientations; the controlling means including means for causing the orienting means to orient the directing means into an orientation configured to direct the polarized light pulse from the upstream source to the downstream destination(see col. 3, lines 36-62), forming a path from an origin endpoint to a terminal endpoint; means for sending polarized-light from the origin endpoint, the sending means configured to send quantum-cryptographic light pulses along the path; means for measuring the polarized-light at the terminal endpoint, the measuring means configured to observe the quantum-cryptographic light pulses(see col. 3, lines 36-62, col. 9, lines 39-61, col. 10, lines 14-48).

Response to Applicant

21. The Applicant states that that Chang fails to disclose measuring a quantum state of the light pulses using a second set of randomly selected quantum bases. Chang discloses an optical signaling header technique for optical networks(see col. 10, lines 24-28). The Examiner asserts that opticals are beams of light. The optical header of Chang is compared to against the label-switch routing look-up table within each network element(see col. 12, lines 43-67).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jenise E. Jackson whose telephone number is (571) 272-3791. The examiner can normally be reached on M-Th (6:00 a.m. - 3:30 p.m.) alternate Friday's.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz Sheikh can be reached on (571) 272-3795. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


April 21, 2006

CHRISTOPHER REVAK
PRIMARY EXAMINER

